AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Original):   A system for delivering a desired mass of gas, comprising:

a chamber;

a first valve controlling gas flow into the chamber;

a second valve controlling gas flow out of the chamber;

a pressure transducer providing measurements of pressure within the chamber;

an input device for providing a desired mass of gas to be delivered from the system;

a controller connected to the valves, the pressure transducer and the input device and programmed to,

receive the desired mass of gas through the input device,

close the second valve;

open the first valve;

receive chamber pressure measurements from the pressure transducer;

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close the inlet valve when pressure within the chamber reaches a predetermined level;

wait a predetermined waiting period to allow the gas inside the chamber to approach a state of equilibrium;

open the outlet valve at time = t_0; and

close the outlet valve at time = t^* when the mass of gas discharged equals the desired mass.

Claim 2 (Original):   A system according to claim 1, wherein the mass discharged Δm is equal to,

$$\Delta m = m(t_0) - m(t^*) = V/R[(P(t_0)/T(t_0)) - (P(t^*)/T(t^*))] \qquad (5)$$

wherein $m(t_0)$ is the mass of the gas in the delivery chamber at time = t_0, $m(t^*)$ is the mass of the gas in the delivery chamber at time = t^*, V is the volume of the delivery chamber, R is equal to the universal gas constant (8.3145 J/mol K), $P(t_0)$ is the pressure in the chamber at time = t_0, $P(t^*)$ is the pressure in the chamber at time = t^*, $T(t_0)$ is the temperature in the chamber at time = t_0, $T(t^*)$ is the temperature in the chamber at time = t^*.

Claim 3 (Original):   A system according to claim 2, further comprising a temperature probe secured to the delivery chamber and connected to the controller, wherein the temperature probe directly provides $T(t_0)$ and $T(t^*)$ to the controller.

Claim 4 (Original):   A system according to claim 3, further comprising a temperature probe secured to the delivery chamber and connected to the controller and wherein $T(t_0)$ and

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$T(t^*)$ are calculated using:

$$dT/dt = (\rho_{STP}/\rho V)Q_{out}(\gamma-1)T + (Nu\ \kappa/l)(A_w/VC_v\rho)(T_w - T) \qquad (3)$$

where ρ_{STP} is the gas density under standard temperature and pressure (STP) conditions, ρ equals the density of the gas, V is the volume of the chamber, Q_{out} is the gas flow out of the delivery chamber, T equals absolute temperature, γ is the ratio of specific heats, Nu is Nusslets number, κ is the thermal conductivity of the gas, C_v is the specific heat of the gas under constant volume, l is the characteristic length of the delivery chamber, and T_w is the temperature of the wall of the chamber as provided by the temperature probe.

Claim 5 (Original): A system according to claim 4, wherein the gas flow out of the delivery chamber is calculated using:

$$Q_{out} = -(V/\rho_{STP})[(1/RT)(d\rho/dt)-(P/RT^2)(dT/dt)] \qquad (4)$$

Claim 6 (Original): A system according to claim 1, wherein the predetermined level of pressure is provided through the input device.

Claim 7 (Original): A system according to claim 1, wherein the predetermined waiting period is provided through the input device.

Claim 8 (Original): A system according to claim 1, further comprising an output device connected to the controller and the controller is programmed to provide the mass of gas discharged to the output device.

Claim 9 (Original): A system according to claim 1, further comprising a process chamber connected to the delivery chamber through the second valve.

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Claim 10 (Original):   A system according to claim 1, wherein the pressure transducer has a response time of about 1 to 5 milliseconds.

Claim 11 (Original):   A system according to claim 1, wherein the second valve has a response time of about 1 to 5 milliseconds.

Claims 12-20 (withdrawn)

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